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FROM: Jason S. Feldmar
OUR REF.: ARC9-00-054US1 (MCM)
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Applicant:	Lawrence Yium-chee Chiu et al.
Serial No.:	09/755,858
Filed:	January 5, 2001
Group Art Unit:	2187
Title:	METHOD AND APPARATUS FOR SUPPORTING PARITY PROTECTION IN A RAID CLUSTERED ENVIRONMENT
Our Ref. No.:	ARC9-00-054US1 (MCM)

Please charge all fees to Deposit Account No. 09-0441 of IBM Corporation, the assignee of the present application.

By: Jason S. Feldmar

Name: Jason S. Feldmar
Reg. No.: 39,187

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Applicant: Lawrence Yium-choc Chiu et al. Examiner: Kimbeerly N. McLean
Serial No.: 09/755,858 Group Art Unit: 2187
Filed: January 5, 2001 Docket: ARC9-00-054US1 (MCM)
Title: METHOD AND APPARATUS FOR SUPPORTING PARITY PROTECTION IN A RAID
CLUSTERED ENVIRONMENT

CERTIFICATE OF MAILING OR TRANSMISSION UNDER 37 CFR 1.8

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By: 
Name: Jason S. Feldmar

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Commissioner for Patents
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Dear Sir:

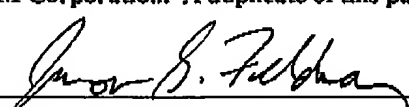
We are transmitting herewith the attached:

- ☒ Transmittal sheet, in duplicate, containing a Certificate of Mailing or Transmission under 37 CFR 1.8.
- ☒ Supplemental Brief of Appellant(s).
- ☒ Please charge the balance due of the filing fee in the amount of \$170 (Fee due \$500 minus \$330 previously paid with the Appeal Brief filed on April 13, 2004) under 37 CFR 41.37(a)(2) and 37 CFR 41.20(b)(2) to Deposit Account No. 09-0441 of IBM Corporation.

Please consider this a PETITION FOR EXTENSION OF TIME for a sufficient number of months to enter these papers, if appropriate.

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JAN 21 2005

Due Date: January 30, 2005

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:)	
)	
Inventor: Lawrence Yium-chee Chiu et al.)	Examiner: Kimberly N. McLean
)	
Serial #: 09/755,858)	Group Art Unit 2187
)	
Filed: January 5, 2001)	Appeal No.: _____
)	
Title: METHOD AND APPARATUS FOR)	
SUPPORTING PARITY PROTECTION IN)	
<u>A RAID CLUSTERED ENVIRONMENT</u>)	

SUPPLEMENTAL BRIEF OF APPELLANTS**MAIL STOP APPEAL BRIEF - PATENTS**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

In accordance with 37 CFR §41.37, Appellants hereby submit the Appellants' Supplemental Brief on Appeal from the rejection in the above-identified application as set forth in the Office Action dated August 31, 2004.

Since this is a Supplemental Appeal Brief and the original Appeal Brief filing fee of \$330 was paid with the Appeal Brief filed on April 13, 2004, only the difference between the original fee and the new fee is due at this time. Accordingly, please charge the amount of \$170 (\$500-\$330) under 37 CFR §41.37(a)(2) and 37(CFR §41.20(b)(2) to Deposit Account No. 09-0441 of IBM Corporation. Also, please charge any additional fees or credit any overpayments to Deposit Account No. 09-0441 of IBM Corporation.

I. REAL PARTY IN INTEREST

The real party in interest is IBM Corporation, the assignee of the present application.

II. RELATED APPEALS AND INTERFERENCES

An Appeal Brief was filed on April 13, 2004. In response, prosecution was reopened in the form of the Office Action mailed on August 31, 2004. In response, a Supplemental Notice of Appeal was filed on November 30, 2004 requesting reinstatement of the prior Appeal. This Supplemental Appeal Brief is in support thereof.

III. STATUS OF CLAIMS

Claims 5, 13, and 21 were canceled in an Office Action response filed on July 16, 2002.

Claims 1-4, 6-12, 14-20, and 22-24 remain in the application.

Claims 1, 4, 7, 9, 12, 15, 17, 20, and 23 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Menon et al. (U.S. Patent No. 5,574,882) in view of Schimmel, UNIX Systems for Modern Architectures Symmetric Multiprocessing and Caching for Kernel Programmers (Schimmel).

Claims 6, 14, and 22 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Menon et al. in view of Schimmel and further in view of IBM Technical Disclosure Bulletin "Limited Distributed DASD Checksum".

Claims 8, 16, and 24 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Menon in view of Schimmel and further in view of Lyons (U.S. Patent No. 6,101,615).

Claims 2-3, 10-11, and 18-19 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Menon in view of Schimmel and further in view of Ofer (U.S. Patent No. 5,892,955).

All of the above rejections are appealed herein.

IV. STATUS OF AMENDMENTS

Subsequent to the rejection, no claims have been cancelled, amended, or added.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Appellants' invention, as recited in independent claims 1, 9, and 17 are generally directed to updating parity data in a RAID clustered environment (see page 2, lines 11-12). Specifically, parity is locked (see page 9, lines 12-14 and line 22), read (see page 9, line 23-23), and new parity data is generated (see page 9, lines 23-24). The new parity data is written (see page 9, line 24) and then unlocked (see page 10, line 1). Further, the commands for writing and unlocking the parity are combined into a single command (see page 10, lines 6-14 and Fig. 3). The combining of these commands into a single command provides for less overhead than other methods for any number of nodes in a cluster (see page 10, lines 6-7).

Dependent claims 4, 12, and 20 provide a further limitation wherein the locking and reading steps of the independent claims are combined (see page 10, lines 6-14, Fig. 2, and Fig. 3).

VI. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1, 4, 7, 9, 12, 15, 17, 20, and 23 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Menon et al. (U.S. Patent No. 5,574,882) in view of Schimmel, UNIX Systems for Modern Architectures Symmetric Multiprocessing and Caching for Kernel Programmers (Schimmel).

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Claims 2-3, 10-11, and 18-19 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Menon in view of Schimmel and further in view of Ofer (U.S. Patent No. 5,892,955).

VIII. ARGUMENT

A. The Independent Claims are Patentable Over the Cited References

The Office Action rejected the independent claims as follows:

Regarding claims 1, 4, 17, and 20, Menon discloses a method of updating parity data in a RAID clustered environment comprising locking parity data, without communicating with other nodes, for data managed in SCSI (small computer system interface) disks in a RAID clustered system (Figure 1; C4, L42; C4, L36; C 6, L 1-46), wherein locking prevents other nodes from modifying the parity (C 6, L 24-26); reading the parity data (C 6, L 27-28); generating new parity data by exclusive oring data from a first node and a second node (C 6, L 29-30); writing the parity data to a SCSI disk in the RAID system (C 6, L 31-44) and unlocking the parity wherein the unlocking and the writing steps are combined (C 6, L 45-46). Menon does not explicitly disclose combining the commands for writing and unlocking into a single command. However, Schimmel teaches the concept of combining commands {read-modify-write instruction – Page 158-160; Section 8.3.3}. This feature taught by Schimmel provides accuracy and efficiency by allowing separate sequential operations to be performed uninterrupted (atomically) and without having to re-obtain access of the bus for each separate command function by using a special instruction which combines three separate commands into one. Additionally, this feature provides efficiency and reduces command processing time since any delays associated with receiving the command separately is omitted (there is no wait time to receive the next command, commands are combined and sent together) and since the device responsible for sending the commands is relieved of sending so many commands given that plural commands are sent at the same time by combining the commands, thereby allowing the device to perform other tasks. Hence, one of ordinary skill in the art would have recognized the benefits of Schimmel's teachings and would have been motivated to use these teachings with the teachings of Menon for the desirable purpose of efficiency, reduced command processing time and accuracy.

Menon merely describes a system and method that is used by software implemented Redundancy Array of Inexpensive Disk (RAID) arrays to achieve adequate performance and reliability, as well as to improve performance or low cost hardware Raids. However, as stated in the Office Action, Menon fails to provide for combining the commands for writing and unlocking into a single command. To teach this claim element, the Office Action relies on Schimmel, page 158-160, Section 8.3.3.

Schimmel merely describes the need to synchronize access to shared memory locations using an atomic read-modify-write operation. Such an operation allows a CPU to read a value from main memory, modify it, and store the modified value back into the same memory location as a single atomic bus operation. Schimmel explicitly states: "Read-modify-write operations are implemented as special instructions in the CPU and are *only* used when such synchronization is necessary." (Emphasis added) (see page 158, section 8.3.3). Appellants note that the processing and processors described in Schimmel relate to multiprocessing (see title page and every section of Schimmel).

However, similar to the previously relied upon Abe reference, Schimmel completely fails to teach, describe, or suggest: (1) a RAID clustered system; (2) a SCSI disk in a RAID system; (3) parity; (4) writing and unlocking parity data; and (5) combining a writing command and an unlocking

command. In fact, electronic searches of Schimmel for the terms "RAID", "SCSI", "parity", and "lock" all came up with no results. Without even mentioning these vital claimed terms, Schimmel cannot possibly teach the invention (or the suggested element) as claimed. In this regard, Schimmel merely describes an atomic read-modify-write operation that allows a CPU to read a value from main memory, modify it, and store the modified value back into the same memory location as a single atomic bus operation. Further, Schimmel is used and addresses a specific multi-processor environment. Further, the use of Schimmel's atomic operation is limited to synchronizing access to shared memory locations and not to a RAID disc system. In this regard, the claimed disc storage environment is significantly distinguishable and has significantly different issues than that of RAM or shared memory in a multiprocessor environment described by Schimmel.

The claims specifically provide for combining a parity writing and parity unlocking command into a single command. There is no suggestion, implicit or explicit, for such an integrated or combined command. In this regard, accessing RAID discs and protecting access to parity data using an integrated command of the invention is not even remotely contemplated or even alluded to by Schimmel.

Appellants also submit that there is no suggestion/motivation to combine Menon with Schimmel. The Office Action provides that the motivation to combine Menon and Schimmel is based on recognizing Schimmel's benefits for the desirable purpose of efficiency, reduced command processing time, and accuracy. The MPEP §2141.01(a) provides "In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned" (In re Oetiker, 977 F.2d 1443, 1446 (Fed. Cir. 1992)). Additionally, in accordance with MPEP §2143, there must be a motivation to combine the references. In this regard, MPEP §2143.01 provides that there must be some teaching, suggestion, or motivation to combine either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art.

In the cited references, Menon's field of invention relates to data storage systems and a method for storing data in a software or low cost hardware implemented storage array system (see col. 1, lines 7-10). However, Schimmel's field of invention relates to a sequential memory model and the ability for multiple CPUs to conduct memory operations (see page 155 section 8.3.1 and 8.3.2). In this regard, Schimmel is directed towards conducting a memory operation from a CPU or I/O device (through DMA) to main memory (see section 8.3.2). Such a field is clearly unrelated to that of Menon and the present invention. In this regard, a programmer concerned with synchronizing multiple processors is not likely to consider and look to data storage systems and RAID environments for any solutions. Further, there is no suggestion to combine such references or fields of art, either implicitly or explicitly within the references. The knowledge generally available to one of ordinary skill in the art also fails to provide such a motivation.

The Office Action relies on the motivation being a desirable purpose of efficiency, reduced command processing time and accuracy. The mere concept of a desire to be more efficient or reduce command processing and accuracy does not even remotely acknowledge the problem Menon (or the present invention) addresses. Also, such a concept fails to provide a motivation to combine the references.

As stated above, Appellants note that Schimmel specifically relates to combining specific commands (e.g., a test-and-set operation) for accessing memory in a multiple processor environment (see page 159). In this regard, the claims are specifically directed to combining a parity writing and parity unlocking command into a single command. Appellants note that the claims are more specific than merely combining commands. Instead, the claims relate to combining parity commands and provides that the commands for writing and unlocking parity are combined into a single command. Schimmel merely talks about combining a read-modify-write command or a test-and-set command and not parity commands as claimed.

In addition to the above, Appellants submit that the present invention provides advantages not acknowledged or suggested at all. For example, the overhead for a cluster with three or more nodes may be significantly reduced (see page 10, lines 4-5 of the specification). In this regard, the overhead is reduced by decreasing the number of commands that are sent. Neither reference acknowledges such overhead, problems, or solutions.

Also, under MPEP 2145, a prior art reference is analogous if the reference is in the field of applicant's endeavor or, if not, the reference is reasonably pertinent to the particular problem with which the inventor was concerned. *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). Appellants submit that Schimmel is not in the field of Appellant's endeavor nor is Schimmel reasonably pertinent to the particular problem with which the inventor was concerned.

In view of the above, Appellants submit that Schimmel completely fails to teach the combining of commands for writing parity and unlocking parity into a single command. Further, Schimmel cannot be combined with Menon because Schimmel is used in a multiprocessor environment while Menon is used in a RAID system. In this regard, there is no/limited overlap between multi-processor systems and RAID system commands.

Appellants also disagree with the assertion in the Office Action that there would be a motivation to combine. There is no reason or motivation in Schimmel that provides for combining commands relating to parity or locking memory. Further, Schimmel's teaching of combined commands does not even refer to or allege the combination of any parity commands whatsoever. Similarly, Menon fails to provide or suggest any of the advantages obtained by the invention or the use of the invention in a graphics environment.

Nonetheless, even if Menon is combined with Schimmel, the combination would fail to teach the invention as claimed. For example, the combination of Menon with Schimmel would teach accessing RAM or main memory using an atomic operation in accordance with Schimmel and then storing the drawings in a RAID environment with appropriate parity. However, the concept of combining a write and unlock parity command for discs in the RAID system as claimed is not even remotely suggested by the references, either separately, or in combination.

Appellants also submit that under MPEP 2141.01, in determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); *Schenck v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983). Accordingly, the claimed invention as a whole must be considered. In this regard, the combination of Schimmel and Menon fails to teach the invention as a whole. For example, as described above, the combination fails to

teach the combination of a write parity command and an unlock parity command into a single command.

B. Claims 4, 12, and 20 are Patentable Over the Cited References

Claims 4, 12, and 20 further provide for combining the locking and reading steps. All of the rationale set forth above applies equally to this claim. Additionally, the claim adds a further limitation with the combination of additional parity commands. The provisions for two different command combinations as set forth in independent claim 1 and dependent claim 4 (independent claim 9 and dependent claim 12, independent claim 17 and dependent claim 20) is also nonobvious in view of both Schimmel and Menon.

Appellants also submit that the rejection fails to provide where the combination of a lock and read steps are described in Schimmel or Menon. In this regard, there is no reference in the rejection to claim 4, 12, and 20 but for the introductory statement "Regarding claims 1, 4, 17, and 20..." and the introductory statement "Regarding claims 9 and 12". Under MPEP §2142 and 2143.03 "To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)." Without addressing the specific language of the claim or addressing each claim limitation specified in claims 4, 12, and 20, Appellants submit that the rejection fails to establish a *prima facie* case of obviousness under 35 U.S.C. §103 and the established case law.

C. The Remaining Claims are Patentable Over the Cited References

The arguments above apply similarly to the remaining claims.

IX. Conclusion

In light of the above arguments, Appellants respectfully submit that the cited references do not anticipate nor render obvious the claimed invention. More specifically, Appellants' claims recite novel physical features which patentably distinguish over any and all references under 35 U.S.C. §§ 102 and 103. As a result, a decision by the Board of Patent Appeals and Interferences reversing the Examiner and directing allowance of the pending claims in the subject application is respectfully solicited.


Respectfully submitted,

GATES & COOPER LLP

Attorneys for Appellant(s)

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Date: January 21, 2005

By: 
Name: Jason S. Feldmar
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G&C 30879.80-US-01

CLAIMS APPENDIX

1. A method of updating parity data in a redundant array of independent disk (RAID) clustered environment comprising:
 - (a) locking parity data, without communicating with other nodes, for data managed in SCSI (small computer systems interface) disks in a RAID clustered system, wherein the locking prevents other nodes from modifying the parity data;
 - (b) reading the parity data;
 - (c) generating new parity data by exclusive oring data from a first node and a second node;
 - (d) writing the parity data to a SCSI disk in the RAID clustered system; and
 - (e) unlocking the parity data, wherein commands for writing and unlocking are combined into a single command.
2. The method of claim 1, wherein the locking comprises issuing a RESERVE command.
3. The method of claim 1, wherein the unlocking comprises issuing a RELEASE command.
4. The method of claim 1, wherein the locking and reading steps are combined.
5. (CANCELED)
6. The method of claim 1 wherein the RAID clustered system is RAID-4.

7. The method of claim 1 wherein the RAID clustered system is RAID-5.
8. The method of claim 1 wherein the RAID clustered system is RAID-6.
9. An apparatus for updating parity data in a redundant array of independent disk (RAID) clustered environment comprising:
 - (a) a plurality of SCSI (small computer systems interface) storage devices organized in a RAID clustered system;
 - (b) data stored in the plurality of SCSI storage devices;
 - (c) a first node, operatively coupled to the plurality of SCSI storage devices, that manages storage and retrieval of the data in the plurality of SCSI storage devices, wherein the first node is configured to:
 - (i) lock parity data without communicating with other nodes, wherein a lock prevents other nodes from modifying the parity data;
 - (ii) read the parity data;
 - (iii) generate new parity data by exclusive oring data from two nodes;
 - (iv) write the parity data to a SCSI disk in the RAID clustered system; and
 - (v) unlock the parity data, wherein logic for writing and unlocking are combined into a single command.
10. The apparatus of claim 9, wherein the first node locks the parity data by issuing a RESERVE command.

11. The apparatus of claim 9, wherein the first node unlocks the parity data by issuing a RELEASE command.

12. The apparatus of claim 9, wherein the first node is further configured to combine logic for locking and reading.

13. (CANCELED)

14. The apparatus of claim 9 wherein the RAID clustered system is RAID-4.

15. The apparatus of claim 9 wherein the RAID clustered system is RAID-5.

16. The apparatus of claim 9 wherein the RAID clustered system is RAID-6.

17. An article of manufacture, embodying logic to perform method steps of updating parity data in a redundant array of independent disk (RAID) clustered environment, the method steps comprising the steps of:

- (a) locking parity data without communicating with other nodes, wherein the locking prevents other nodes from modifying the parity data;
- (b) reading the parity data;
- (c) generating new parity data by exclusive oring data from two nodes;
- (d) writing the parity data to a SCSI (small computer systems interface) disk in the RAID clustered system; and

(c) unlocking the parity data, wherein commands for writing and unlocking are combined into a single command.

18. The article of manufacture of claim 17, wherein the locking comprises issuing a RESERVE command.

19. The article of manufacture of claim 17, wherein the unlocking comprises issuing a RELEASE command.

20. The article of manufacture of claim 17, wherein the locking and reading steps are combined.

21. (CANCELED)

22. The article of manufacture of claim 17 wherein the RAID clustered system is RAID-4.

23. The article of manufacture of claim 17 wherein the RAID clustered system is RAID-5.

24. The article of manufacture of claim 17 wherein the RAID clustered system is RAID-6.